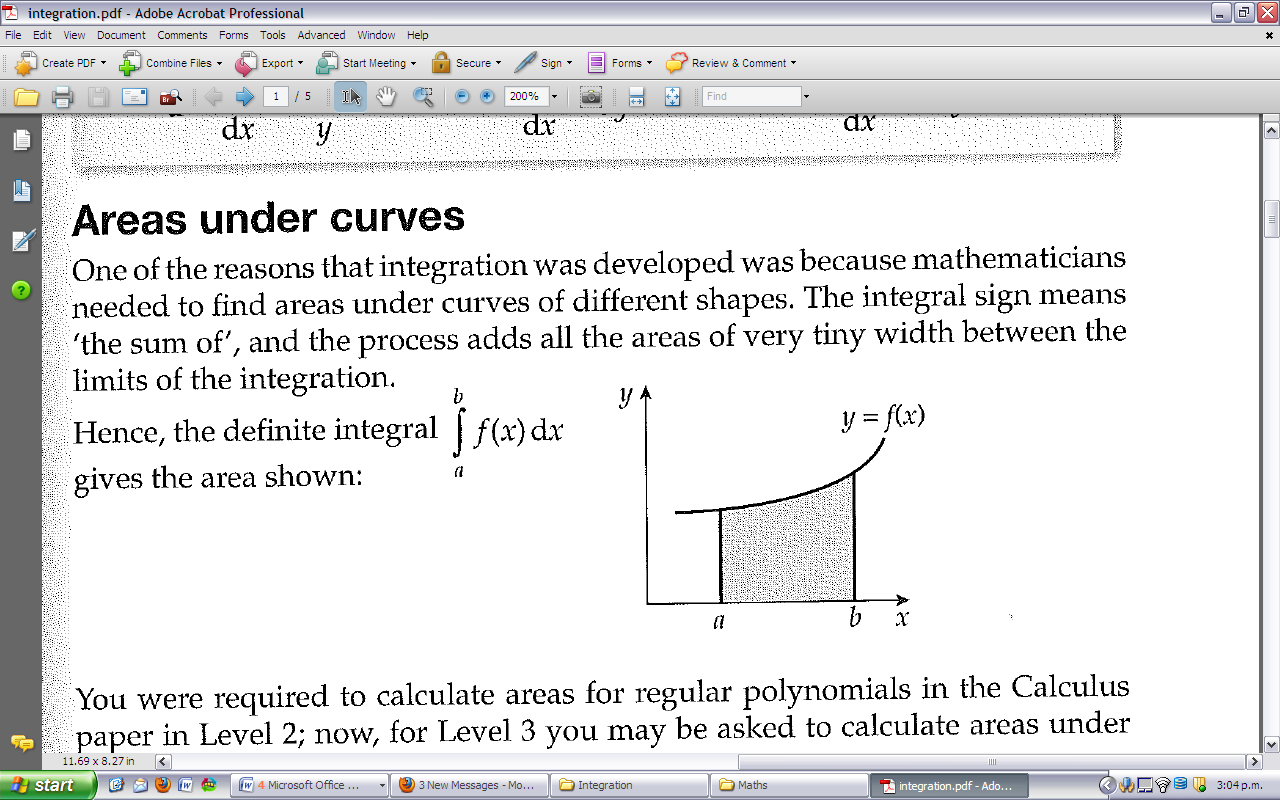
**6) Areas under curves**

The definite integral gives the area under the

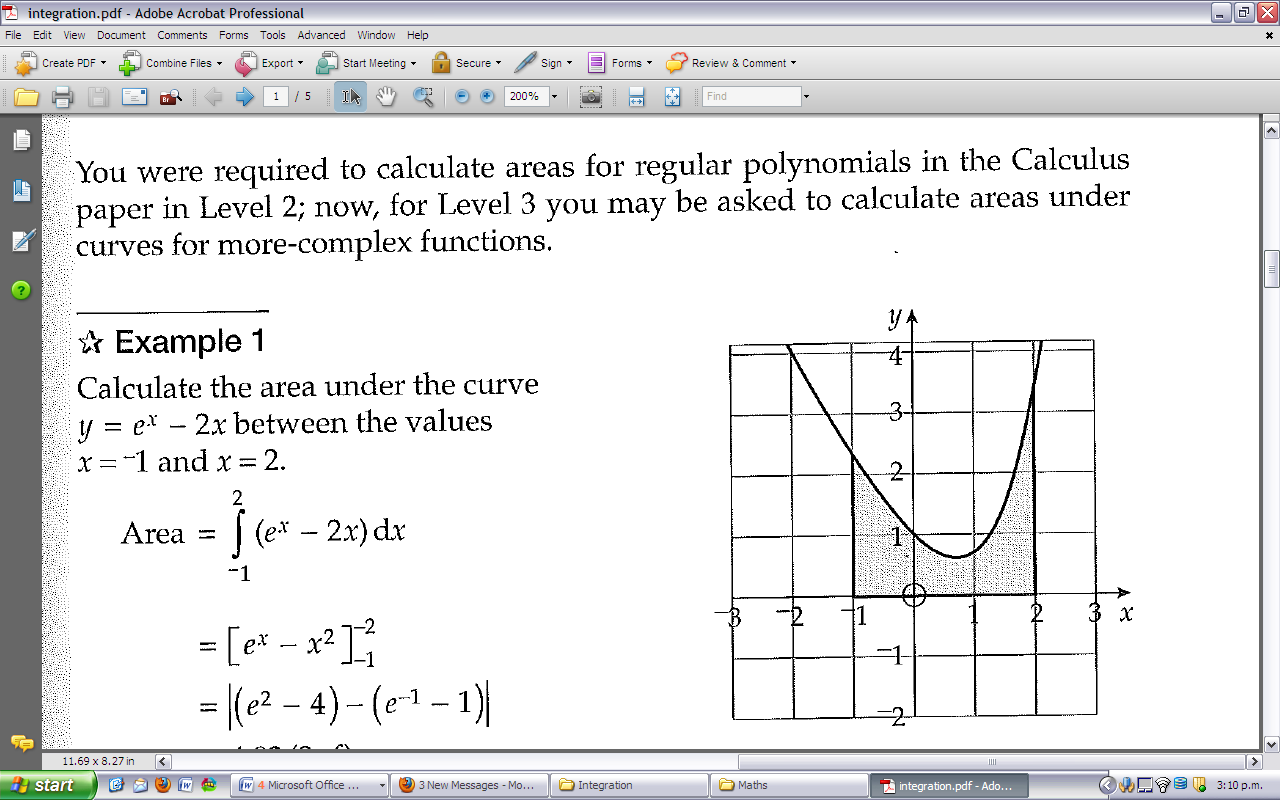
curve for the interval .

The integral sign means ‘the sum of’, and the process

adds all the areas of very tiny width between the

limits of the integration. The limits in the diagram above are and .

Later we will look at ***numerical*** methods of adding all the areas of very tiny width to find the total area under the curve, but for now we will use means of integration to find it.



**Example 1**: Calculate the area under the curve

between the values

and .

Area =

must show the integrated fn in square brackets

=

=

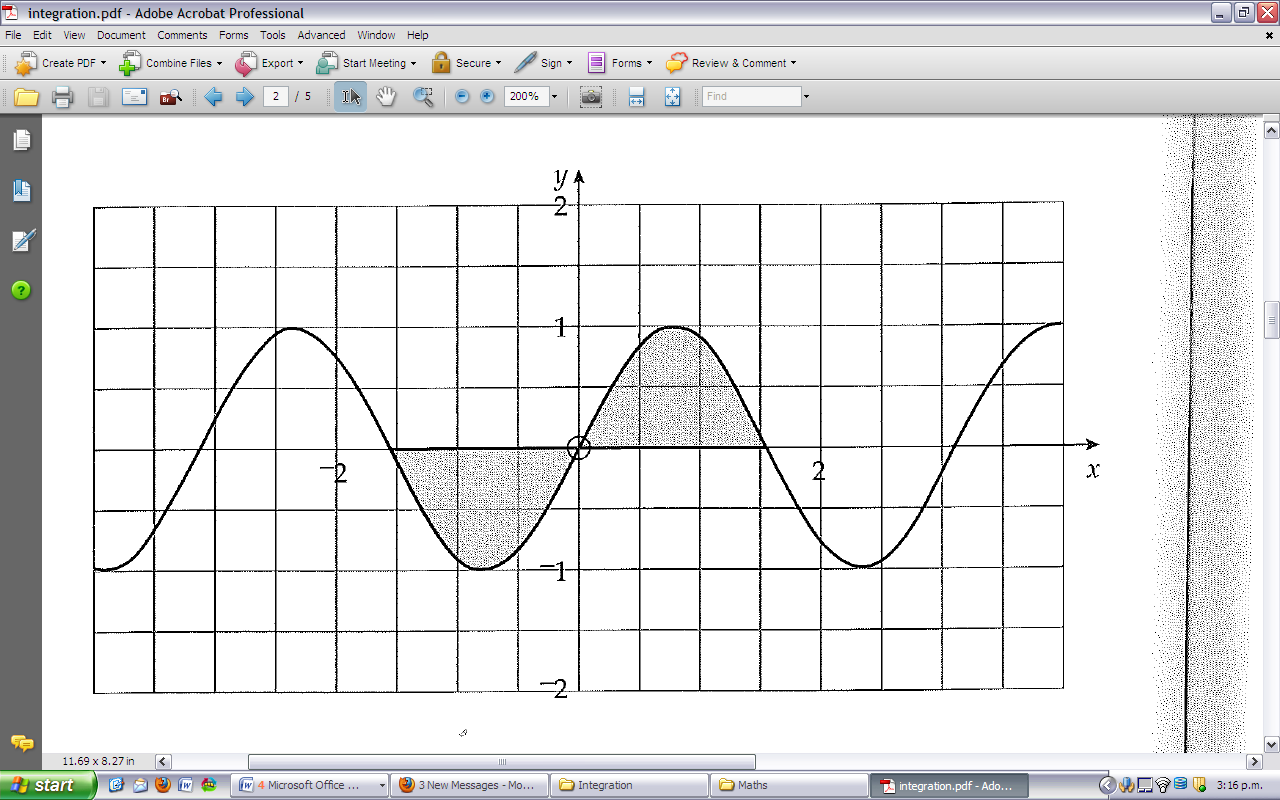
= 4.02 units (2dp)

won’t need this line of working, use GC

-------------------------------------------------------------------------------------------------------------------------

If the area we are looking at has parts of the graph sitting below the -axis, we must separate the area into parts, because the area under the -axis will generate a negative answer and result in an incorrect value.

**Example 2**: Find the shaded area for the curve . Notice the symmetry on the shape. You are given that the -intercepts are: .



Split the graph into two parts, one interval is (the part of the graph that is under the -axis) and the second interval is (the part of the graph is that above the -axis). We will take the absolute value of the integral of the first interval, as it will come up negative.

Area =

=

=

=

=

= units2

Delta Ex 20.1

pg 186 - 187